

PHIN Stakeholders' Conference

Session 5E

Meeting the Challenges of Electronic Information
Exchange with Multiple Partners

5/14/03

Dr. Jim Pearson

Division of Consolidated Laboratory Services (DCLS)

- **The State public health, environmental, agriculture and consumer protection laboratory for Virginia.**
- **Conduct nearly 4 million tests per year with over 600 different types of analyses.**
- **Provide service to approximately 26 state agencies**
 - **VDH, DEQ, VDACS, DEM**
 - **Police & Fire Depart.s, Hazmat, City and County Water Suppliers**
 - **FDA, EPA, USDA, CDC**
- **Mission is to protect the health of the citizens of**

Core Functions of a Public Health Laboratory

- Emergency Response
- Disease Prevention, Control and Surveillance
- Environmental Health and Protection
- Food Safety
- Public Health-Related Research
- Reference and Specialized Testing
- training and Education
- Partnerships and Communication
- Laboratory Improvement and Regulation
- Policy Development
- Integrated Data Management

Sample Collection and Transport

- Sample Collection
 - Instructions
 - Kits
 - After-Hour Consultation (Emergency Response Officer)
- Sample Collection Training
- Security and Chain of Custody
- Sample Delivery
 - Courier Service
 - Special Courier (State Police, DEM teams, Forensics, Customer Agency)

Testing Methods

- Research and Development

- Project Proposals
- Resource Allocation
- Progress Reporting

- Quality Assurance

- QA Plan
- QA Committee
- Method Validation
- Performance Validation
- Proficiency

Education and Training

- Training Office
- NLTN
- Customer Support
 - Local Health Directors
 - Medical community
 - Law Enforcement
 - Hazmat and Fire
 - State Agencies (DEQ, VDH, VDACS)
 - General public

Committees

- Regional Environmental Crimes Task Force
- State Environmental Crimes Task Force
- Bioterrorism Response and Preparedness
- Food Safety
- Richmond-metro Hazmat workgroup

Security

- Personnel checks
- 24 hour guard service
- Roaming safety/security patrols
- Restricted building access
- Room restrictions
- Cameras
- Secure sample/evidence storage
- COC procedures

Partnerships

- First Responders
 - Fire, VDEM, Law Enforcement, National Guard, VDEQ
 - FBI, CDC, DOD, Secret Service, NCIS
- Attorney General and US District Attorney
- VDH
 - Emergency Preparedness and Response Team
 - Rad Health, Toxic Chemicals, Drinking water, Epi Support
 - State Epidemiologist
 - Toxicologist

Partnerships (cont.)

- Agriculture
 - Food Safety, Veterinary Toxicology
- Hospitals
 - Performance Work, Poison Control
- Local Health Directors

Biological Capabilities

- Molecular biology
- Microbiology
- Enterics
 - Parasitology, Enterics
- Vector borne viruses
 - WNV, Arbovirus
- Biological Terrorism Agents
 - *B. anthracis*, *F. tularensis*, etc.

Chemical Capabilities

- Environmental Organic Analysis
 - Air, Water, Soil, Vegetation
- Metal Analysis
 - Water, Soil, and Unknown
- Inorganic Nonmetal Analysis
 - pH, Ions, TSS, BOD, etc.
- Chemical Warfare Agent Analysis
 - Unknowns, Hazmat, Other legal samples
 - Nerve agent, Mustards, Lewisites, CN, etc.

Other Capabilities

- Microscopy of Unknowns
- Food Analysis
 - Veterinary Toxicology
 - Food Adulteration
 - Consumer Complaints
 - Compliance

Examples

- B. anthracis
- Chemical spills
- Tire fire
- Poisoning
- Suspicious mail
- Heavy metal exposure
- Malicious use/misuse of chemicals

Division of Consolidated Laboratory Services Bureau of Analytical Services

Food, Feed and Fertilizer

Metals/ radiochemistry

Microbial Reference

Trace Organics

Newborn Screening

Virology/Immunology

Inorganic Chemistry

**Epidemiologic
Support**



Collaboration

- **Federal**

- CDC
- FBI
- DOD
- USAMRIID
- DARPA
- USDA
- FDA
- EPA
- DOJ
- AFIP

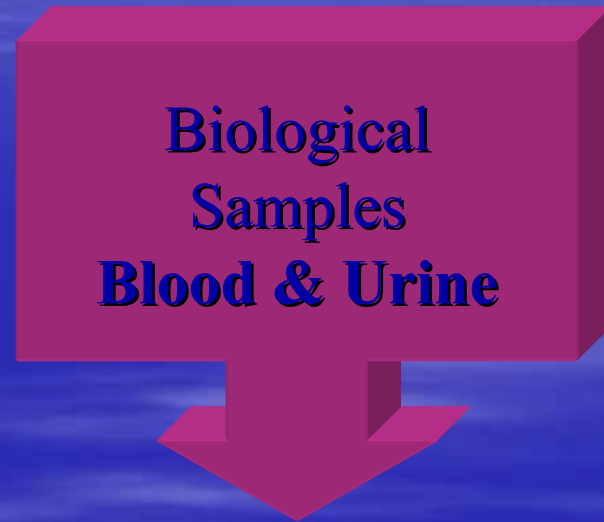
- **Local/State**

- Law Enforcement
- DEM
- AG's Office
- Environmental Crimes Task Force
- FBI
- Fire Departments
- DEQ
- VDACS
- VDH
- National Guard

Federal Responsibilities



EPA, FBI



CDC

Biomonitoring

- **Assessment of exposure to toxic substances by measurement in specimens**
 - Blood (e.g. Lead Safe Virginia program)
 - Serum
 - Urine (e.g. Alachlor & metolachlor)
 - Saliva
 - Tissue

GC/MS/MS and LC/MS/MS



The Purpose of Newborn Screening

To support the Commonwealth's mandate to provide statewide screening for every baby born in Virginia - for the prevention of mental retardation and death.

To provide timely and accurate screening for all Virginia babies - that will enable the rapid diagnosis and the swift initiation of treatment for any affected infants.

PFGE Subtyping at DCLS

Routine:

- *Escherichia coli* O157:H7
- *Salmonella* (all serotypes)
- *Listeria monocytogenes*
- *Shigella sonnei*

Outbreak-related:

Clostridium spp.
aureus

Staphylococcus

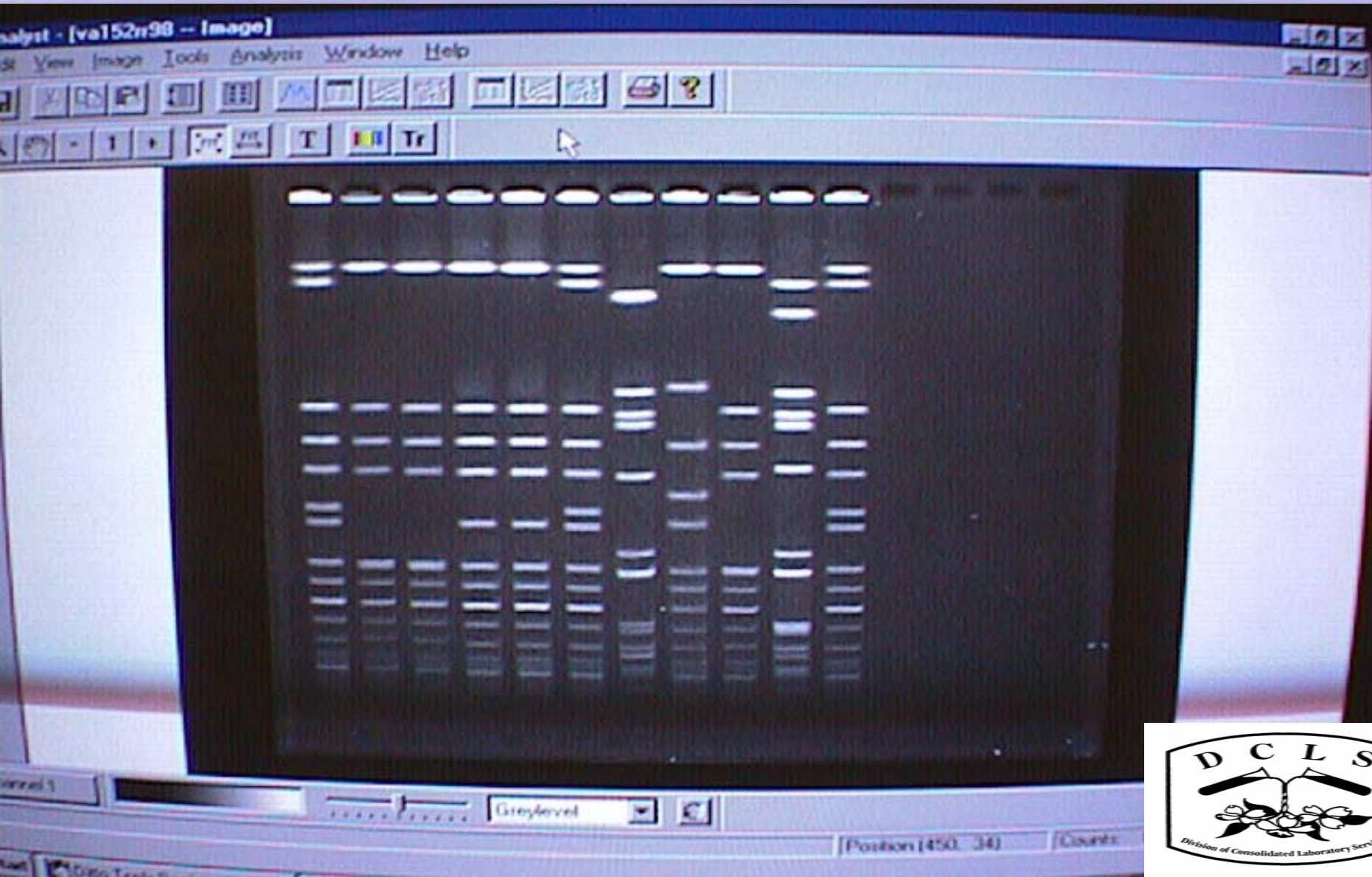
Yersinia spp.

Legionella pneumophila

Enterococcus faecalis

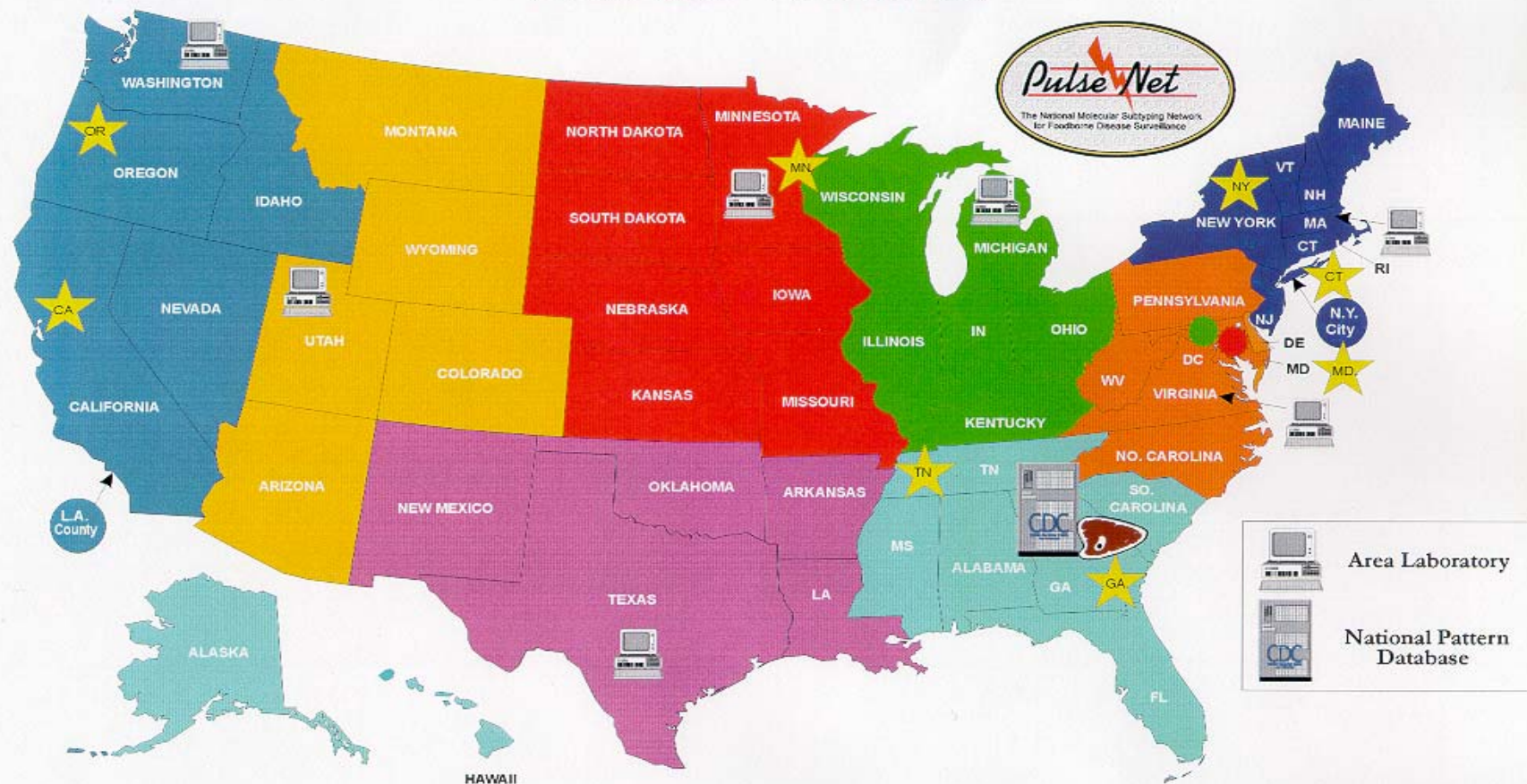
Campylobacter

DNA Fingerprinting



The National Molecular Subtyping Network for Foodborne Disease Surveillance

Area Lab Territories



Electronic Communication forwarded to ALL PulseNet Participating Laboratories



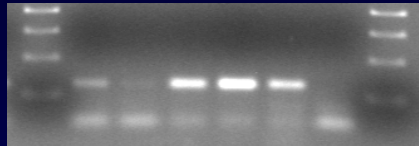
CaliciNet

Nucleotide Sequence Analysis

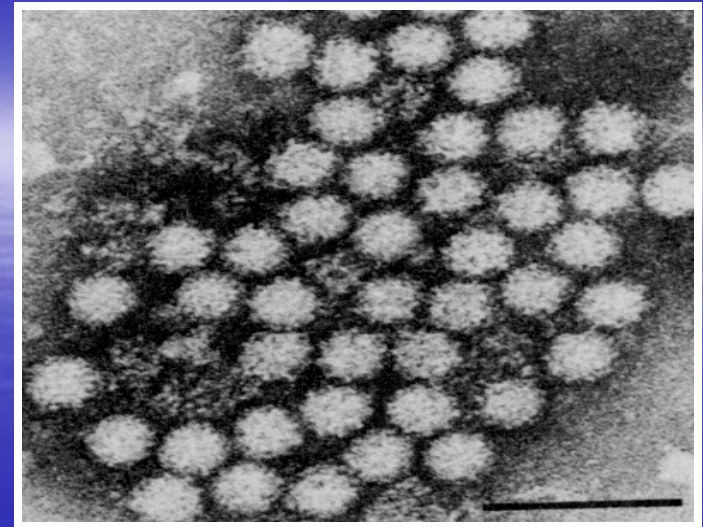
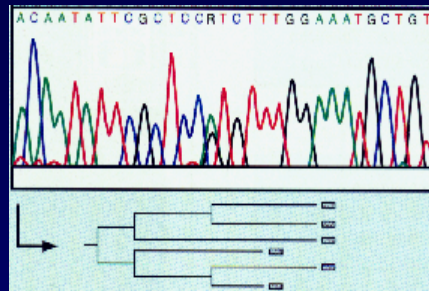
Raw Stool



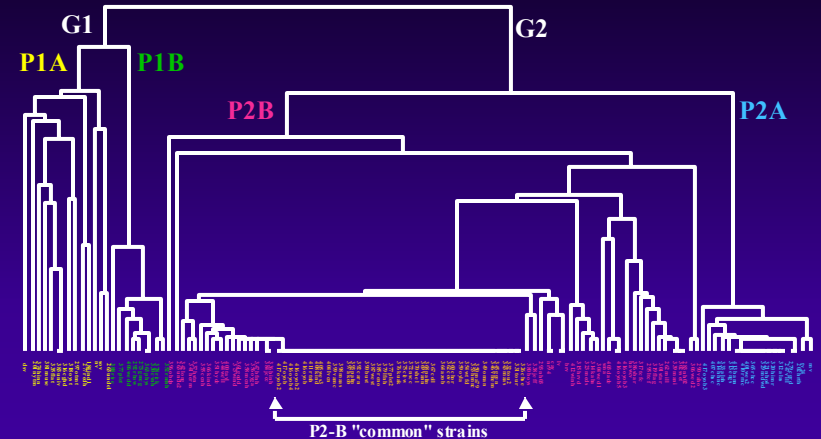
RT-PCR



Automated
Sequencing
(subtyping)



Genetic Relatedness of NLV Outbreak Strains

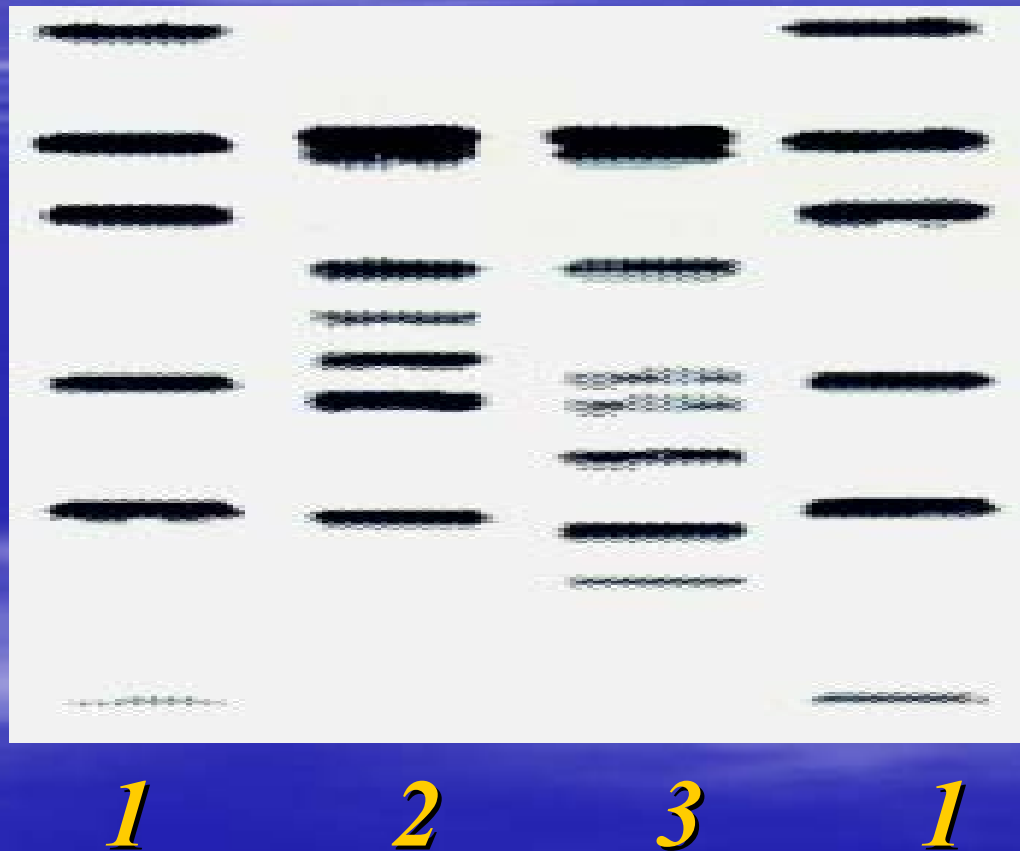


COMING SOON, TO YOUR COMPUTER!
The Electronic Calicivirus Comparison Network



Ribotyping

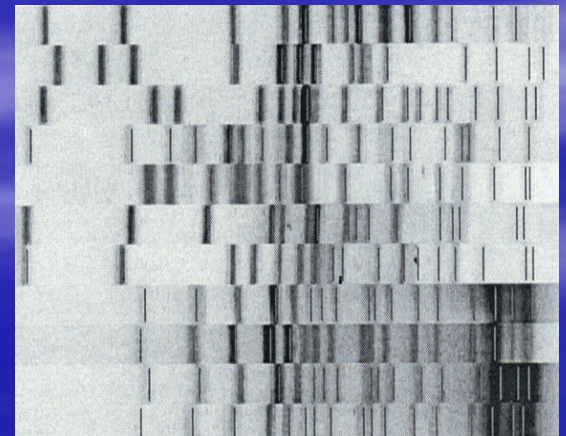
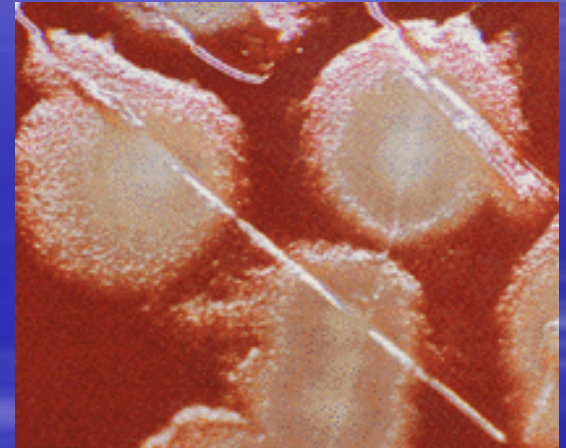
Identification and Serotyping Tool



Pattern designations

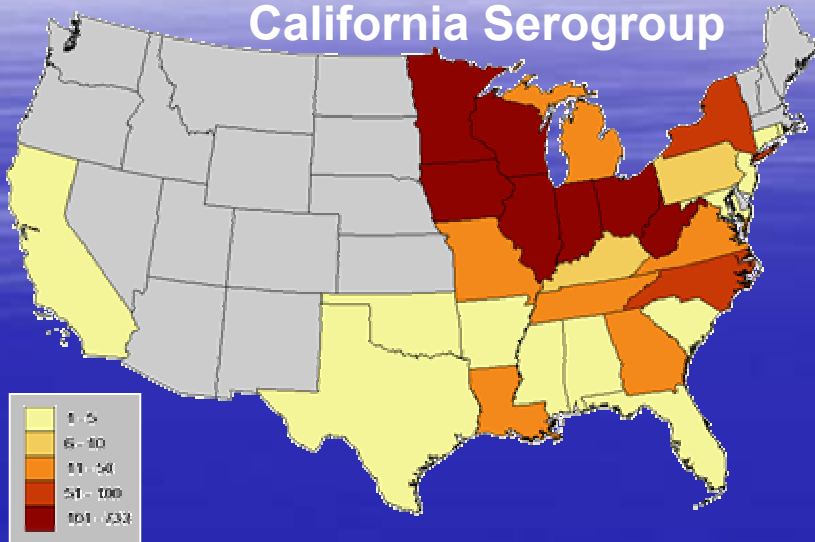
Environmental Microbial Source Tracking

- Identify potential sources of fecal contamination
 - increase in animal population
 - nutrient loading
 - intentional or unlawful discharge
- Lab-based Source Tracking
 - culture isolation
 - DNA fingerprinting

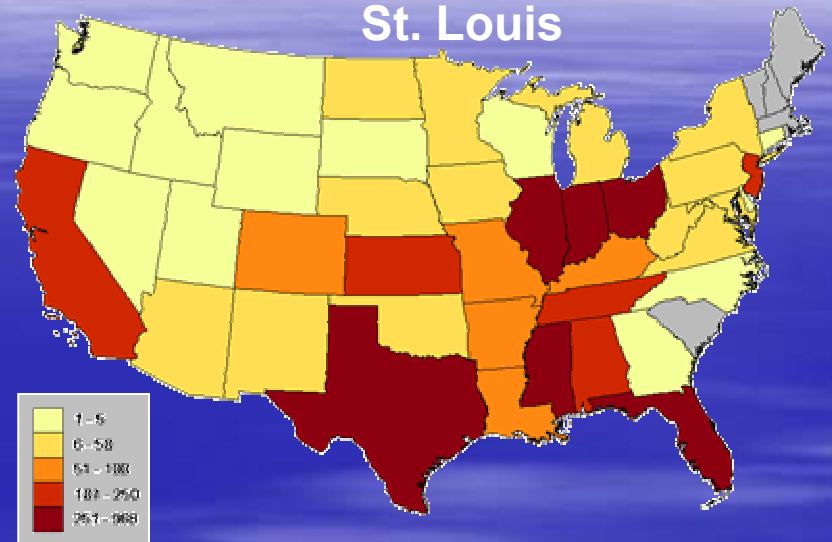


Common Arboviruses in the United States

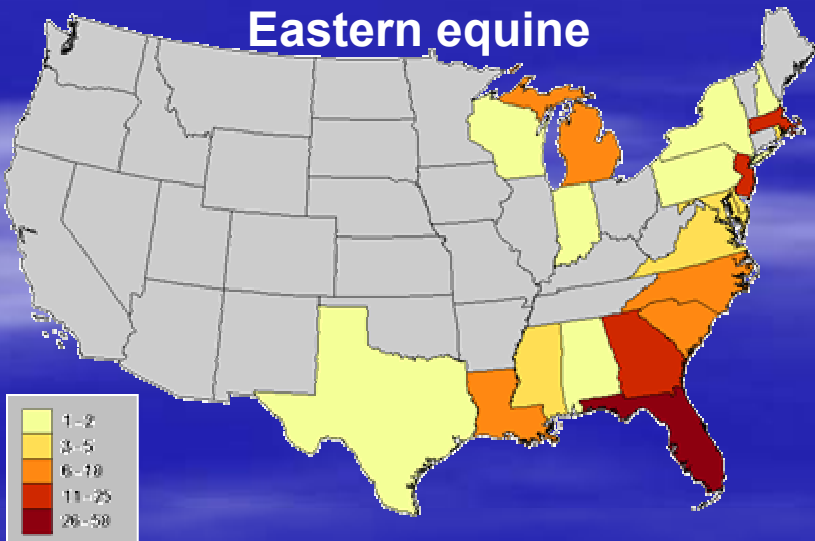
California Serogroup



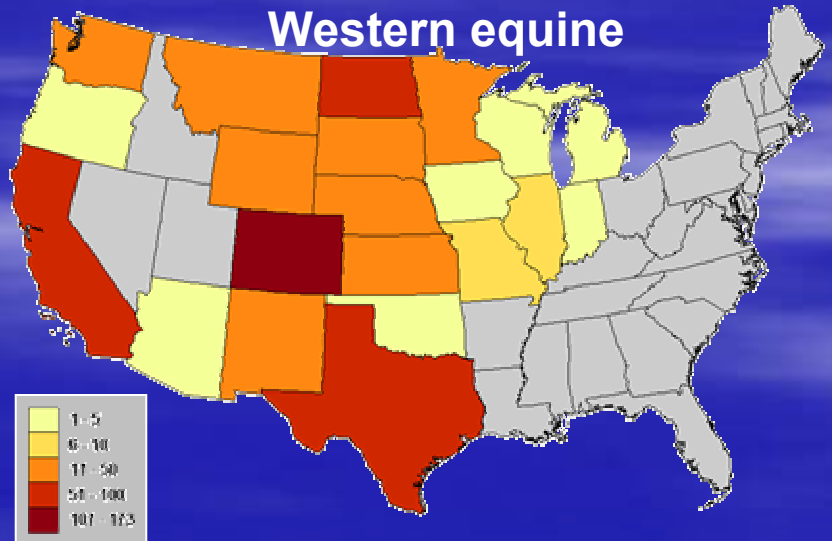
St. Louis



Eastern equine



Western equine



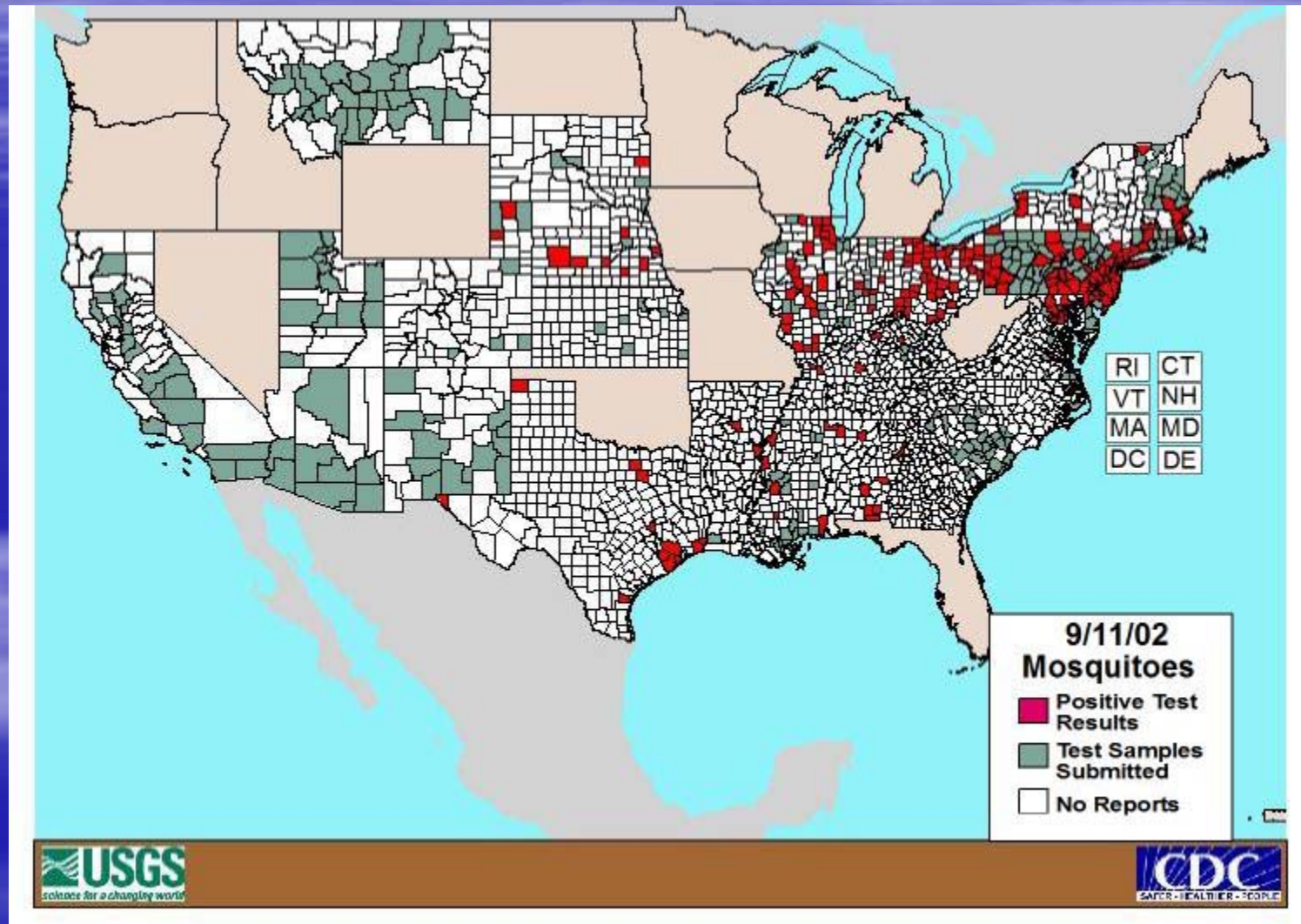
Mosquito Testing



- Virus isolation
- RT-PCR



WNV Positive Mosquitoes USA 2002



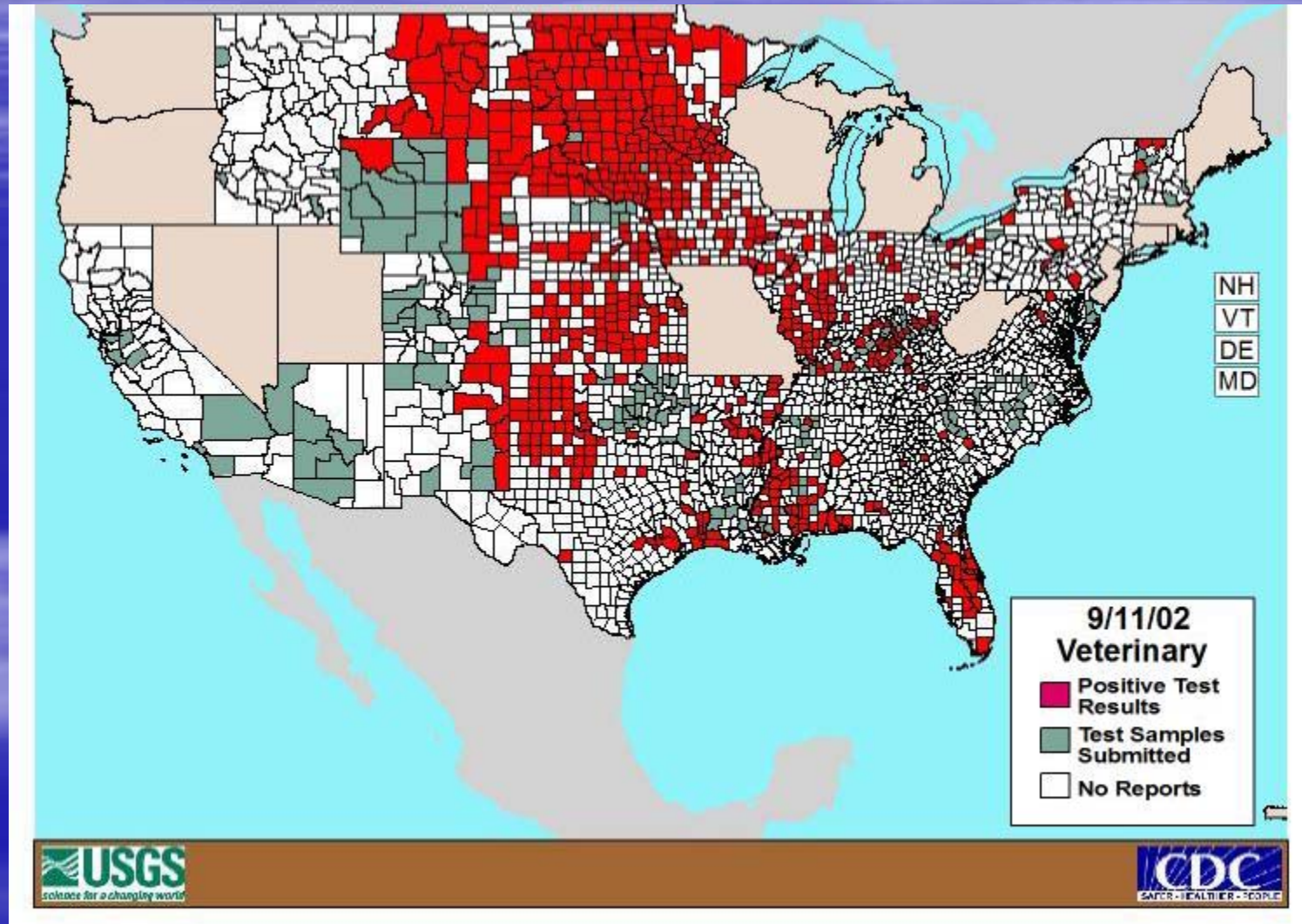
Detection of WNV

Avian Tissue

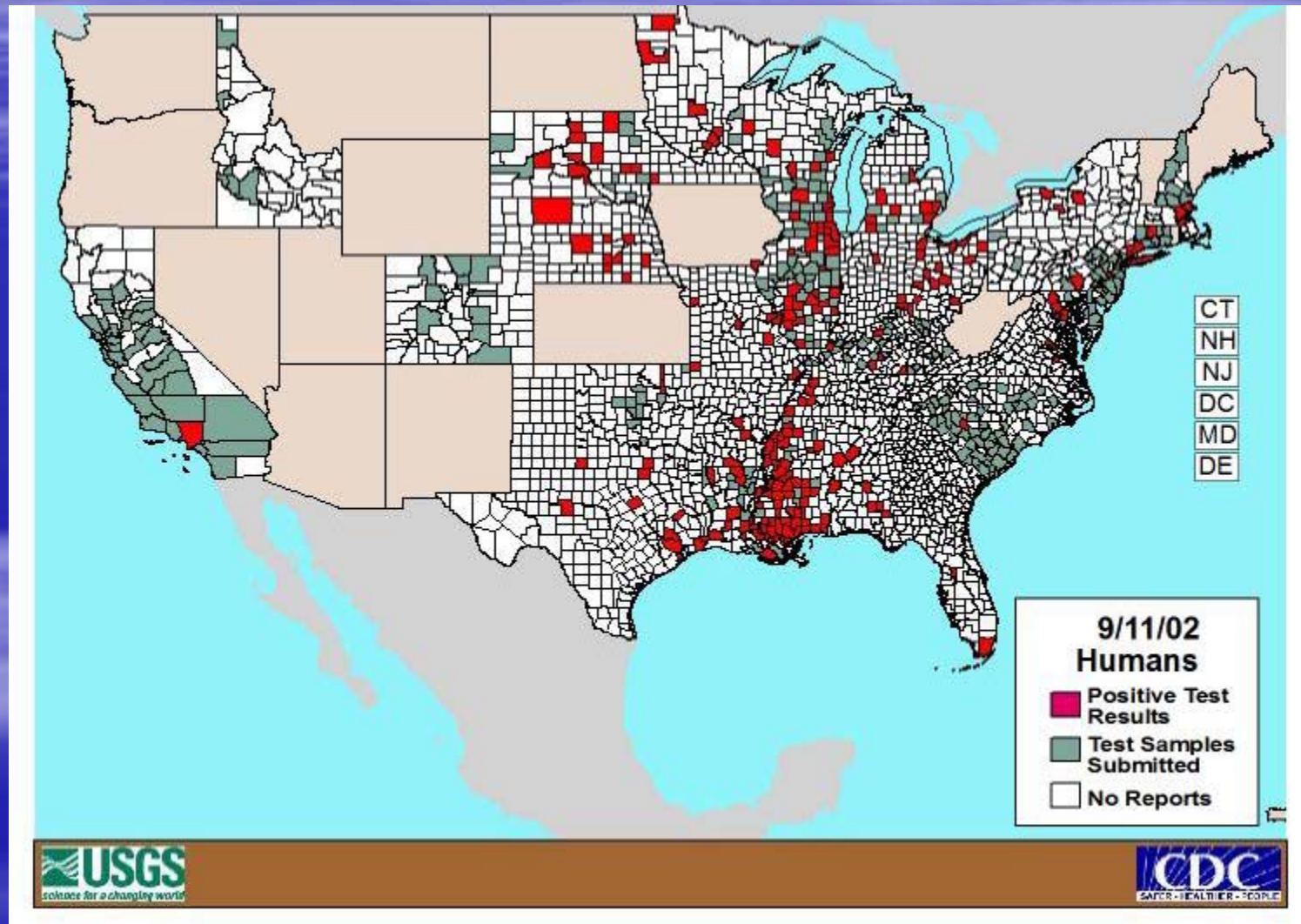


- Necropsy
- Nucleic acid extraction
- Real-time PCR
 - Rapid analysis
 - Closed system
 - Amplicon confirmation

WNV Positive Horses USA 2002



WNV Positive Humans USA 2002



Summary

- Coordination, communication, cooperation among data sources: local, state and federal is essential to success.
- Multiple data types, formats, sources, purposes, uses.
- Tools for analysis of data from multiple sources.
- Missions of the collecting organizations may not be complimentary (may conflict!).
- Security: facilities, personnel, systems access, communications, chain-of-custody records, audit trail.